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(71) Applicant

Ethicon Inc. (USA-New Jersey),  
Route 22, Somerville, New Jersey, United States of  
America

(72) Inventor

John William Walmsley

(74) Agent and/or Address for Service

Carpmaels & Ransford,  
43 Bloomsbury Square, London WC1A 2RA

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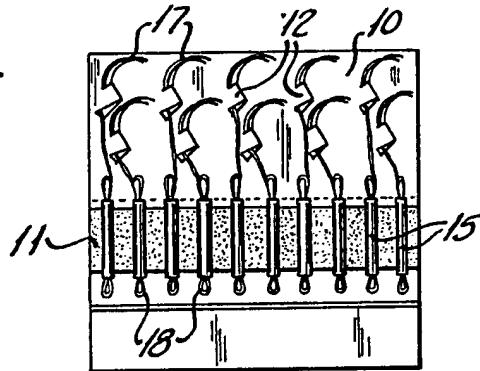
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(58) Field of search  
B8C

(54) Multi-strand suture package for  
single suture dispensing

(57) In a multi-strand suture package  
each suture (18) is wound in a  
multiplicity of superimposed  
convolutions and stored in a cylindrical  
tube (15) which is preferably open at  
both ends and is mounted on a backing  
member (10). At least one end (17) of  
each suture is retained by the backing  
member.

FIG-5



GB 2 148 232 A

1/4

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FIG-1

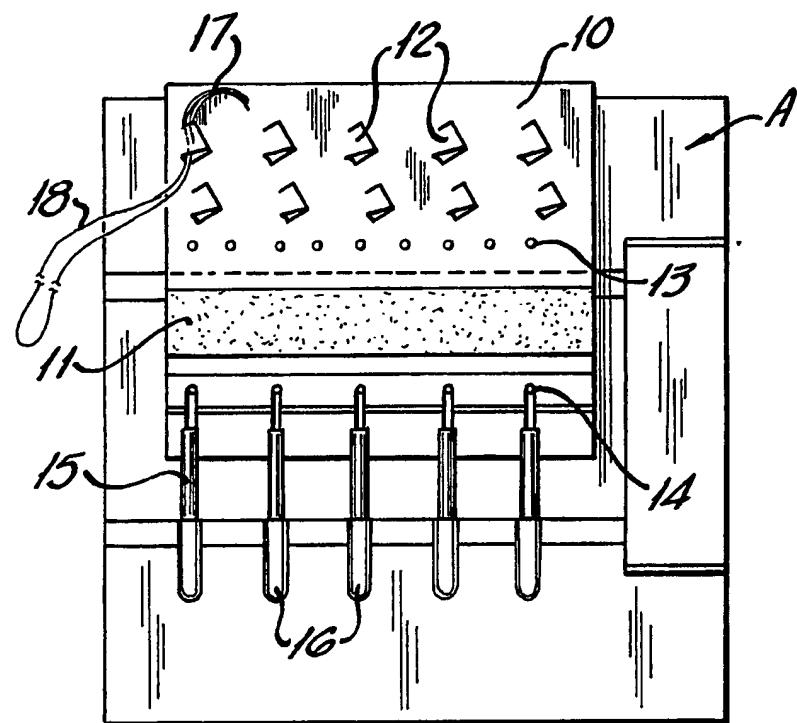


FIG-2

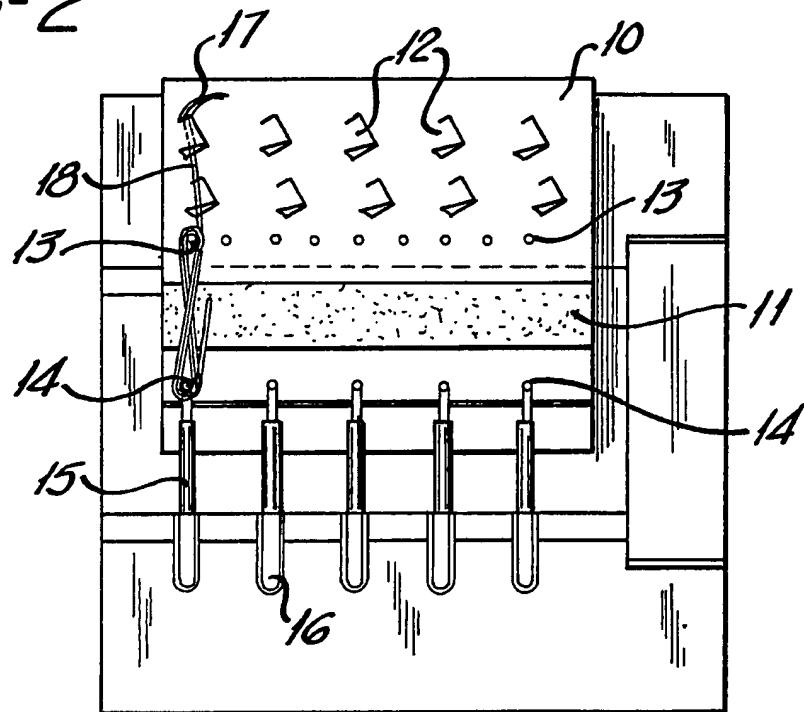
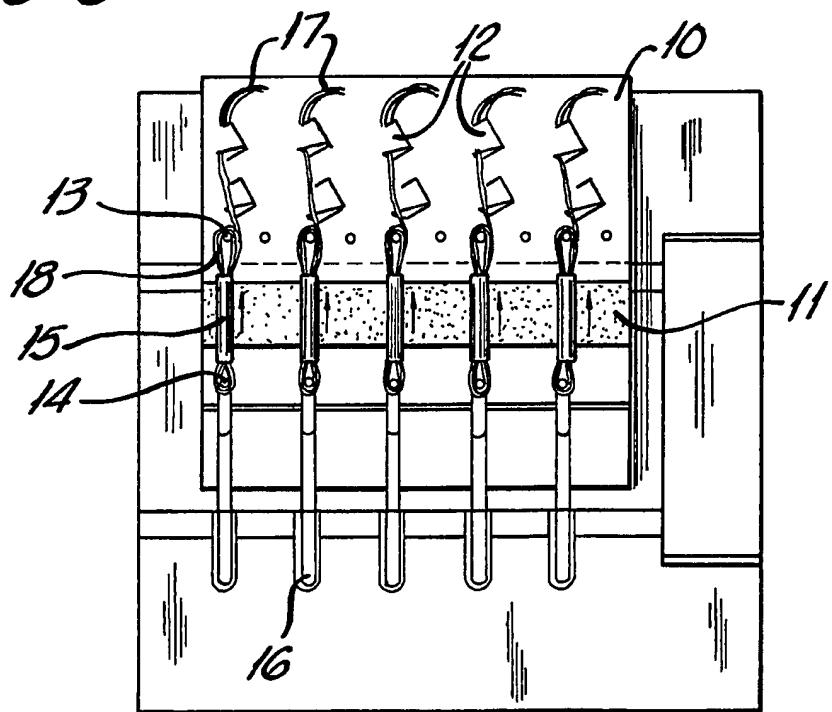


FIG-3



3/4

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FIG-4

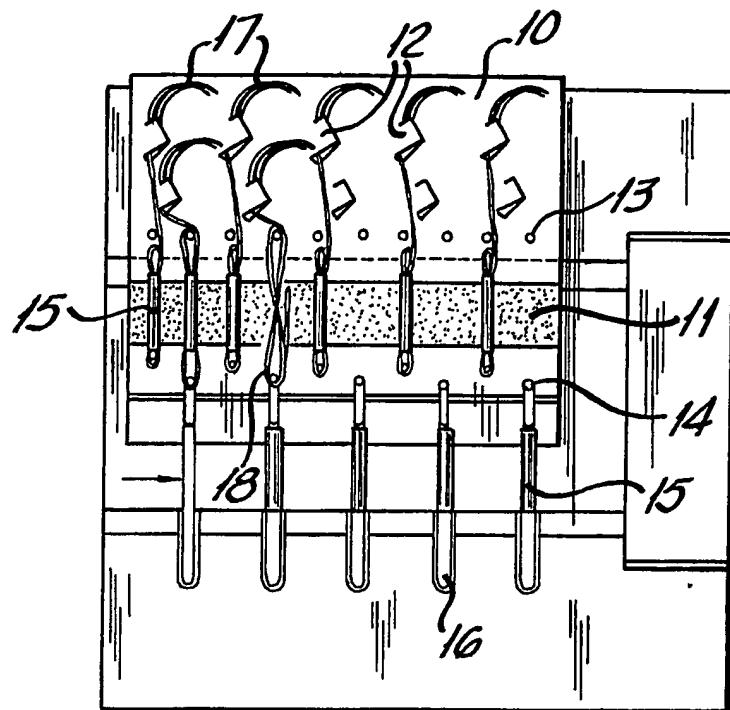
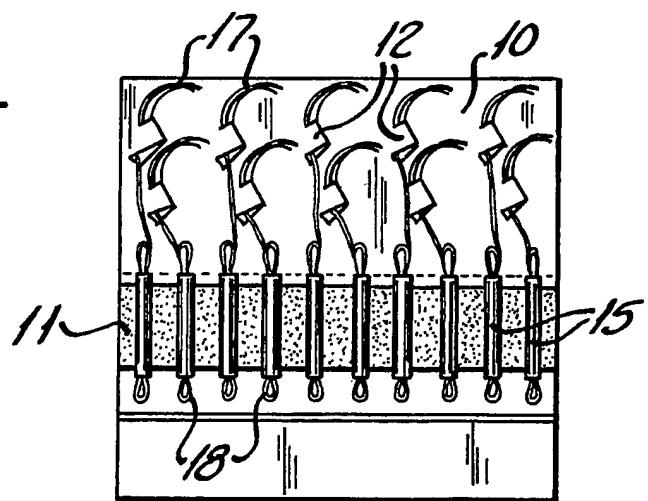


FIG-5



4/4

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FIG-6

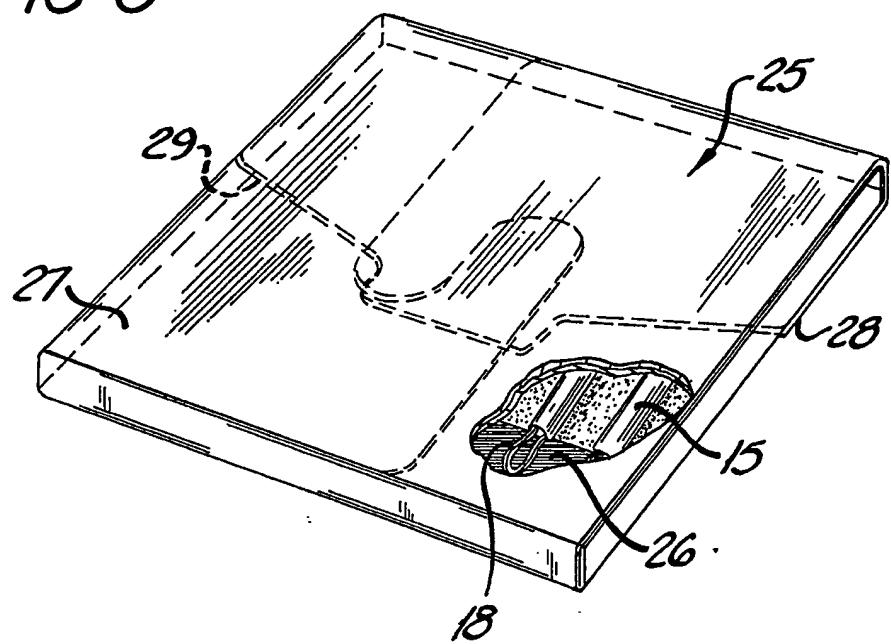
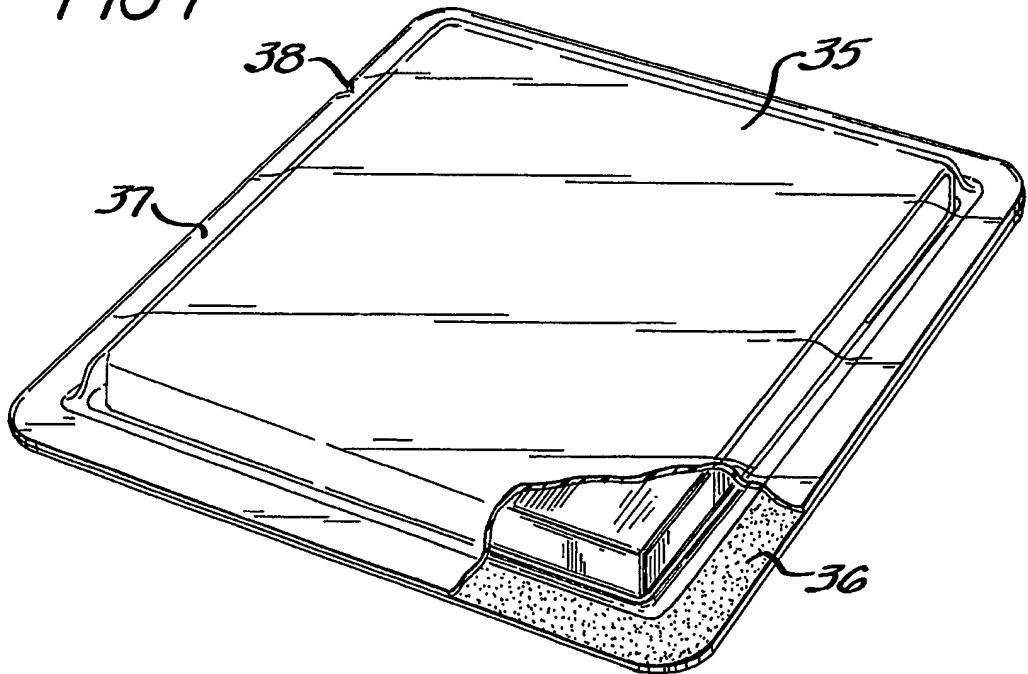


FIG-7



## SPECIFICATION

**Multi-strand sutur package for single sutur dispensing**5 *Background of the invention*

The present invention relates to packages for surgical sutures with the sutures disposed in convoluted or looped form, and more particularly to 10 packages for sterile double-armed sutures.

The term "suture" or "sutures" as used in this application means elongated strands suitable for suturing, ligating or other surgical procedures and includes strands commonly called sutures and ligatures.

15 The term "double-arm sutures" as used in this application means a suture that has affixed to each end a surgical needle.

20 *Description of the prior art*

In many surgical procedures, especially those in the specialties of cardiac or vascular procedures, the procedure requires a large number of double-armed sutures to be used in performing the operation. To meet this need, the suture manufacturers supply sutures in what are termed multi-strand packages. As a matter of convenience to the surgeons and operating room personnel a number of sutures are packaged in a single package. Generally, the package contains the number of sutures expected to be used in the surgical procedure.

25 Such packaging requires fewer packages to be opened in the surgical area. Such packaging also means there is less extraneous material deposited about the operating theatre. Also, by packaging a multiplicity of sutures in a multi-strand package the sutures themselves are kept from being scattered about the operating area.

When providing a multi-strand suture package it 40 is critical the package be designed to allow for individual sutures to be removed from the package without entanglement or disruption and preferably no movement of adjacent sutures. It is of the utmost importance that the multi-strand package 45 provides for single strand dispensing. In the past this characteristic of single strand delivery from a multi-strand package has been obtained by providing a number of compartments within one package, the compartments being similar to those used 50 for individual suture dispensing. This results in a package of substantial size, however, such packages have gained considerable acceptance and are more fully described for example in U.S. Patent 3,857,484. The multi-strand packages should be relatively easy to load with sutures for economical 55 reasons. Also, the package should be as compact as possible. Furthermore, it is important that the package presents individual sutures so they may be removed from the package without disruption 60 of any of the other sutures in the package. Also, the package should be adaptable to contain unarmed, single-armed or double-armed sutures.

65 It is an object of the present invention to provide a new and improved package for surgical sutures which provides for single-strand delivery. My new

package can accept unarmed, single-armed or double-armed sutures or any combination as desired.

My new packages are economical to fill, economical to manufacture and of minimal size. The packages of the present invention may also be adapted to accept sutures which have pledges attached to them or other additional components which may be threaded or attached to the suture.

70 *Summary of the present invention*

In accordance with the present invention a folded package for multi-strand sutures is provided which will hold two to ten or more sutures in a predetermined convoluted, looped or figure-eight configuration within adjacent but separate compartments. The package of the present invention contains a plurality of sutures disposed to allow for removal of individual sutures as desired without disruption or movement of adjacent sutures. The

75 Improved package of the present invention comprises a plurality of cylindrical tubes. The tubes are spaced from each other and are mounted on a suitable backing member. Each tube contains a suture wound in a multiplicity of superimposed convolutions of loops. At least one end of the sutures is retained by the backing member. In certain preferred embodiments of the present invention the tubes are open at both ends and the suture is a double-armed suture with a needle attached at

80 each end of the suture and with both needles retained by the backing member. In certain embodiments of the present invention the sutures have been wound in a figure-eight configuration before being placed in their cylindrical tube. The package

85 with the sutures in their tubes and the ends attached to the backing may be hermetically sealed in an outer container and sterilized by techniques well known in the art. Other and further advantages of the invention will appear to those skilled 90 in the art from the following description and claims taken together with the accompanying drawings.

95 *Brief description of the drawings*

Figure 1 is a plan view of the package of the present invention showing an initial double-armed suture with the needles retained by the package;

100 Figure 2 is a plan view of the package of Figure 1 showing the first double-armed suture wound in place;

105 Figure 3 is a plan view of the package depicted in Figure 1 with the first five double-armed sutures wound in place;

110 Figure 4 is a plan view of the package of Figure 3, with a second set of double-armed sutures shown being wound in place;

115 Figure 5 is a plan view of a completed package of Figure 1 with all ten double-armed sutures wound in place;

120 Figure 6 is a perspective view, with portions cut away, showing the package of Figure 5 contained in a suitable protective cardboard wrapper; and

125 Figure 7 is a perspective view of the package of Figure 6 contained in a hermetically sealed package.

*Detailed description of the drawings*

In Figures 1-5 the same numerals are used to identify like parts in the figures. The package of the present invention comprises a backing member 10. 5 Mounted on this backing member, in the embodiment shown, is a two-sided tape 11 i.e., the tape has adhesive coated on both sides. The two-sided tape could be replaced by glue or other similar securing means. The upper portion of the package 10 includes a plurality of flaps or slits 12 for retaining the ends of the suture. Disposed below these slits is a line of openings 13 which are disposed between the flaps and tape. Disposed below the tape are another series of openings 14. The backing 15 member is mounted on a suitable jig A with pins extending through both lines of openings. Also, mounted on this jig is a plurality of cylindrical tubes 15 which are mounted on pins 16 disposed in a plane parallel to the plane of the backing 20 member. As seen in Figure 1 the two needles 17 of a double-arm suture 18 are caught in the uppermost left-hand corner flap. The loop of suture from the double-armed needles, as more clearly shown in Figure 2, is wound about the first pin in the upper 25 per row and the first pin in the bottom row. When completely wound the looped centre end of the double-arm suture needle is pointing toward the needles. The cylindrical tube is then slipped off its longitudinal pin to encase the figure-eight wound 30 suture. This procedure is followed with a double-arm suture retained in each additional flap in the upper row flaps on the backing member. Each suture is wound about odd number pins in the two rows of pins; that is about the third, fifth, seventh, 35 and ninth pins of the rows as shown in Figure 3. After all five sutures have been wound and encased in their appropriate cylindrical tubes, the backing member is removed and set off by one set of pins and placed back on the jig. The second row 40 of double-arm sutures is wound in a similar manner as shown in Figures 4 and 5. As shown in Figure 5 two rows of five double-arm sutures is contained with each suture individually contained in a cylindrical tube.

45 To protect the suture, the suture is overwrapped or encased in a wallet of foldable cardboard. As more clearly shown in Figure 6 the wallet 25 comprises a back panel 26, two side interlocking flaps 27 and 28, and a front panel 29 which covers the 50 interlocked flaps and locks with the backing panel. A backing member containing the appropriate number of individually wound sutures is placed in the center of the wallet and the wallet folded to totally encase the mounted sutures. The wallet 35 as 55 shown in Figure 7 is heat sealed between two outer layers of heat sealable material. The heat sealable material is sealed together about the periphery of the wallet to hermetically seal the wallet in the package. If desired a notch 38, to allow for 60 easy tearing of the hermetically sealed package may be provided. The sealed package may then be sterilized by irradiation, ethylene oxide, heat, or other sterilizing techniques well known in the art. The package may also be overwrapped or placed 65 in a further carton or package as desired.

The backing member should be made of relatively stiff cardboard material that had some rigidity so that it will maintain its shape in the final wrapped package. Five or twelve point Kraft paper 70 has been found most acceptable.

Though double adhesive faced tape has been disclosed for holding the cylindrical tubes on the backing member, other securing means may also be used, such as glues, pressure sensitive adhesives, or various mechanical securing means. Also, the needles at the end of the suture may be retained as I have described in the drawings by suitable cut flaps. They may also be retained by other securing means, such as adhesives or the like. The 75 tubes themselves may be made from paper, plastic, or even glass as desired.

The wallet is produced from suitable, foldable, reasonably rigid paper or cardboard materials, such as five to twelve point Kraft paper board. The 80 package is overwrapped in suitable heat sealable layers, such as thermoplastics films, coated foils, coated foil-paper laminates, and the like as desired and as are well known in the art.

The sutures that may be packaged in accordance 85 with the present invention may be any of the monofilament or multifilament sutures made from virtually any materials. The sutures may be unarmed, single-armed, or double-armed as desired.

Having now described the present invention, it 90 will be readily apparent that various modifications and alterations may be made to the present invention without departing from its spirit or scope. It is my intent to be only limited by what is covered by the claims appended hereto.

100

## CLAIMS

1. A package containing a plurality of sutures 105 disposed to allow removal of individual sutures as desired with no disruption or movement of adjacent sutures comprising; a plurality of cylindrical tubes, said tubes being mounted on a backing member, each tube containing a suture wound in a multiplicity of superimposed convolutions or loops 110 and at least one end of the wound suture being retained by said backing member.

2. A package according to claim 1 wherein the cylindrical tubes are open at both ends thereof.

3. A package according to claim 1 or 2 wherein 115 the sutures are double-armed sutures and both needles of each suture are retained by the backing member.

4. A package according to claim 1, 2, or 3 wherein the sutures are wound in figure-eight convolutions.

5. A package according to claim 1, 2, 3, or 4 wherein the package is overwrapped and hermetically sealed within an outer envelope.

6. A package according to claim 1 wherein the 120 tubes are mounted on the backing card by adhesive means.

7. A package according to claim 1, 2, or 6 wherein the convolutions each comprise a centrally located suture crossing and opposed loops on 130 each side of said crossing and integral, with suc-

cessive figure-eight convolutions being superimposed one upon the other to dispose the convolutions in successive layers, needles being affixed to each end of each suture and extending from one of 5 the open ends of each cylinder and held in position on the backing member.

8. A pack according to claim 1, 6, or 7 wherein the needles are held on the backing member by flaps cut in said backing member.

10 9. A suture package substantially as hereinbefore described with reference to Figures 1 to 6, or 1 to 7, of the accompanying Drawings.

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